Pipeline Integrity Management

Scope of Subpart O

Pipeline integrity management in high consequence areas.

This section applies to each operator who owns or operates a transmission line that transports gas, including, petroleum gas, hydrogen, or other gas product covered under this part.

Note: Jurisdictional Gathering Lines are presently excluded from IMP Rule.

Pipeline Integrity

- The ability of a pipeline to operate safely and withstand the stresses imposed during operation.

Integrity Management - General

What is Integrity Management?

Involved and detailed process using threat identification, risk analysis, assessment methods, evaluations, remediation, re-assessments, and continuous improvement to accomplish one thing –

"Keep the product in the pipeline"

Requires written plan and detailed documentation each step of the way

Potential Threats to Pipeline Integrity

* Time Dependent (Corrosion-Related)
* Static or Resident (Fabrication or Construction Related)
* Time Independent (Outside Forces, Third Party, Vandalism, Weather-Related)
* Human Error

Gas Integrity Management Rule

- Identification of HCA's
  - Class 3 and 4 Locations
  - CFER Circle with 20 or More Building Intended for Human Occupancy
  - "Identified Site"
    - Outside Area or Open Structure Occupied by 20+Persons on at Least 50 Days in any 12 Month Period
    - Building Occupied by 20+ Persons on at Least 5 Days a Week for 10 Weeks in Any 12 Month Period
    - Facility Occupied by Persons Confined, Have Impaired Mobility, or Would be Difficult to Evacuate.

HCA Definition (192.903)

Potential Impact Radius (PIR)

$$PIR = 0.69 \sqrt{(pd^2)}$$

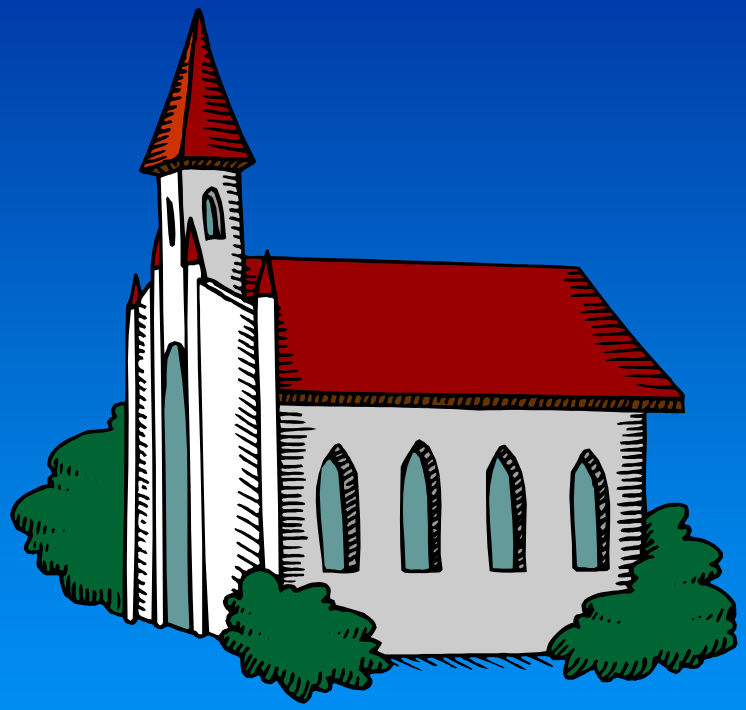
p is the MAOP

d is the nominal diameter of pipe

Must consult with public safety officials or emergency response officials to find identified sites. If they do not have this information, must "do more." See July 17, 2003 OPS Advisory for guidance..

Identified Sites

- ***Parks and ball fields***
- ***Beaches***
- ***Rec areas or playgrounds***
- ***Campgrounds***
- ***4-H Facilities***
- ***Hospitals***
- ***Assisted Living facilities***
- ***Community centers***
- ***Day Care facilities***
- ***Prisons***
- ***Outdoor theaters***
- ***Religious facilities***
- ***Roller staking rinks***
- ***Golf courses? Parking Lots? Roads?***



Transmission Line

"Transmission line" means a pipeline, other than a gathering line,, that:

(a) Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume customer that is not downstream from a distribution center;

(b) Operates at a hoop stress of 20 percent or more of SMYS; or

(c) Transports gas within a storage field.

A large volume customer may receive similar volumes of gas as a distribution center, and includes factories, power plants, and institutional users of gas.

Transmission Line

(b) Operates at a hoop stress of 20 percent or more of SMYS; or

§192.105 $P = 2st/D \times (F)(E)(T)$

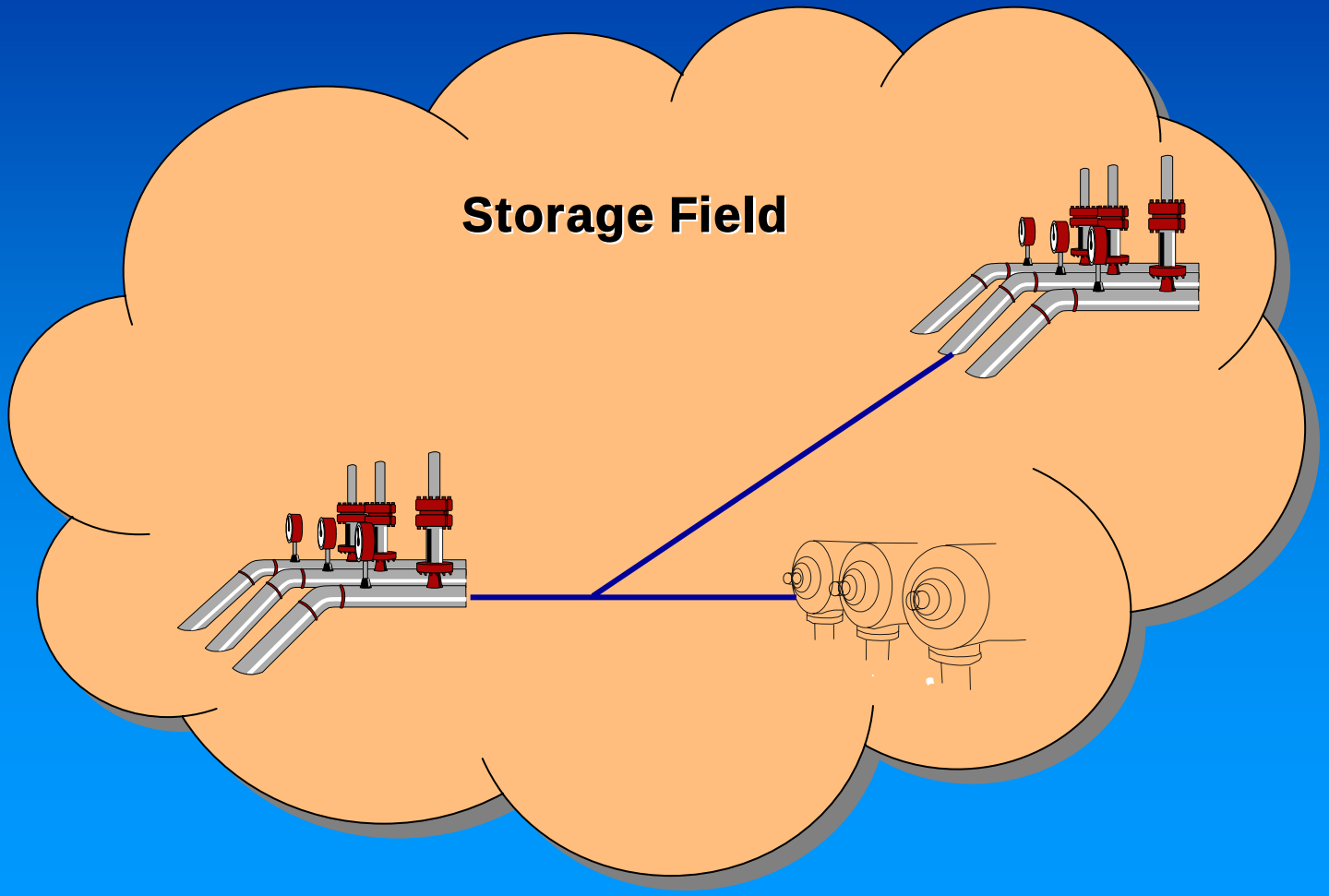
$P = (2st/D)\ (20\%)$

Grade B, 6”, .250 wt

$P = ((2)(35{,}000)(.250)/6.625))(.20) = 528\#$

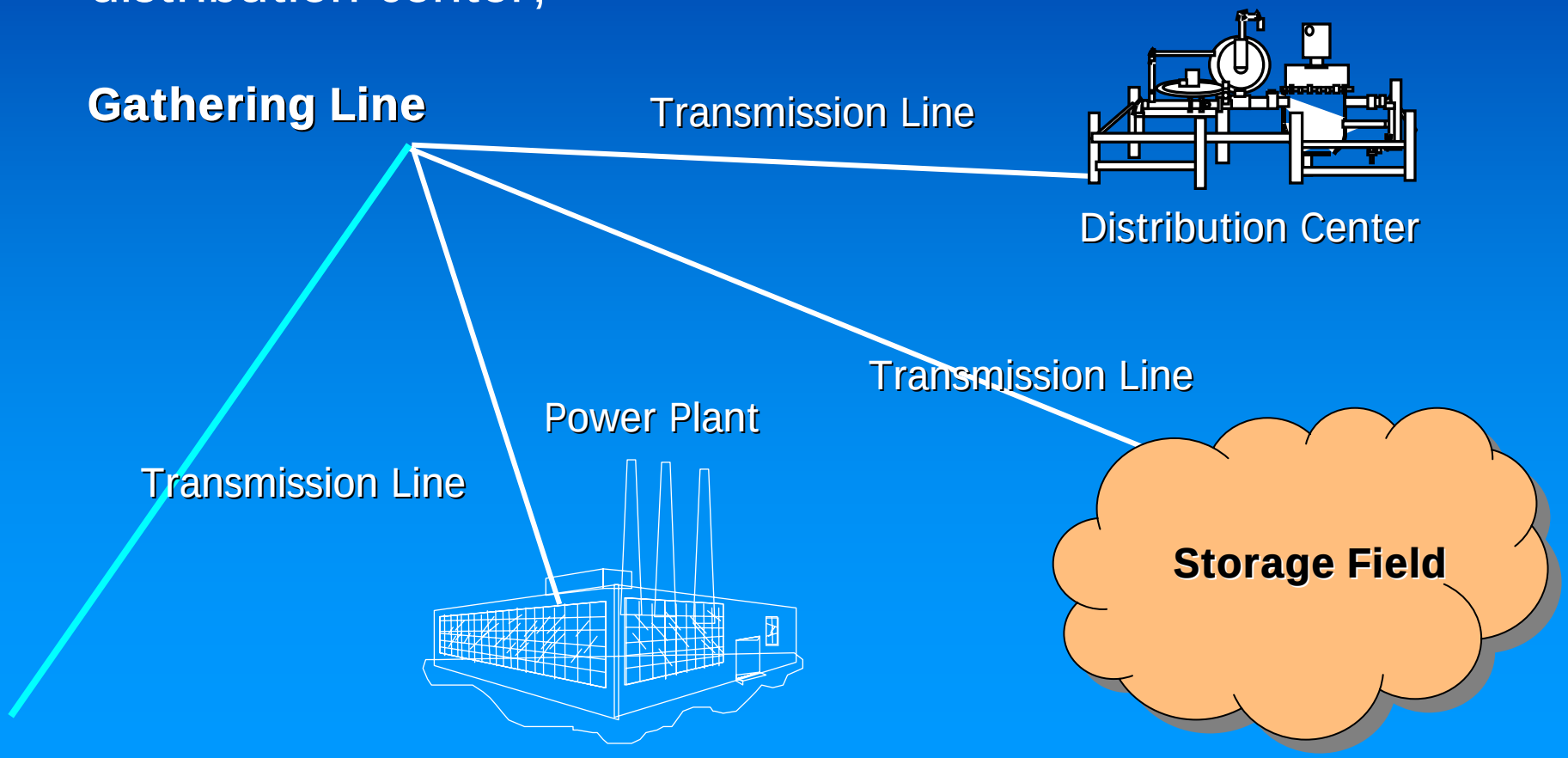
Transmission Line

(c) Transports gas within a storage field.



Transmission Line

(a) Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume customer that is not downstream from a distribution center;



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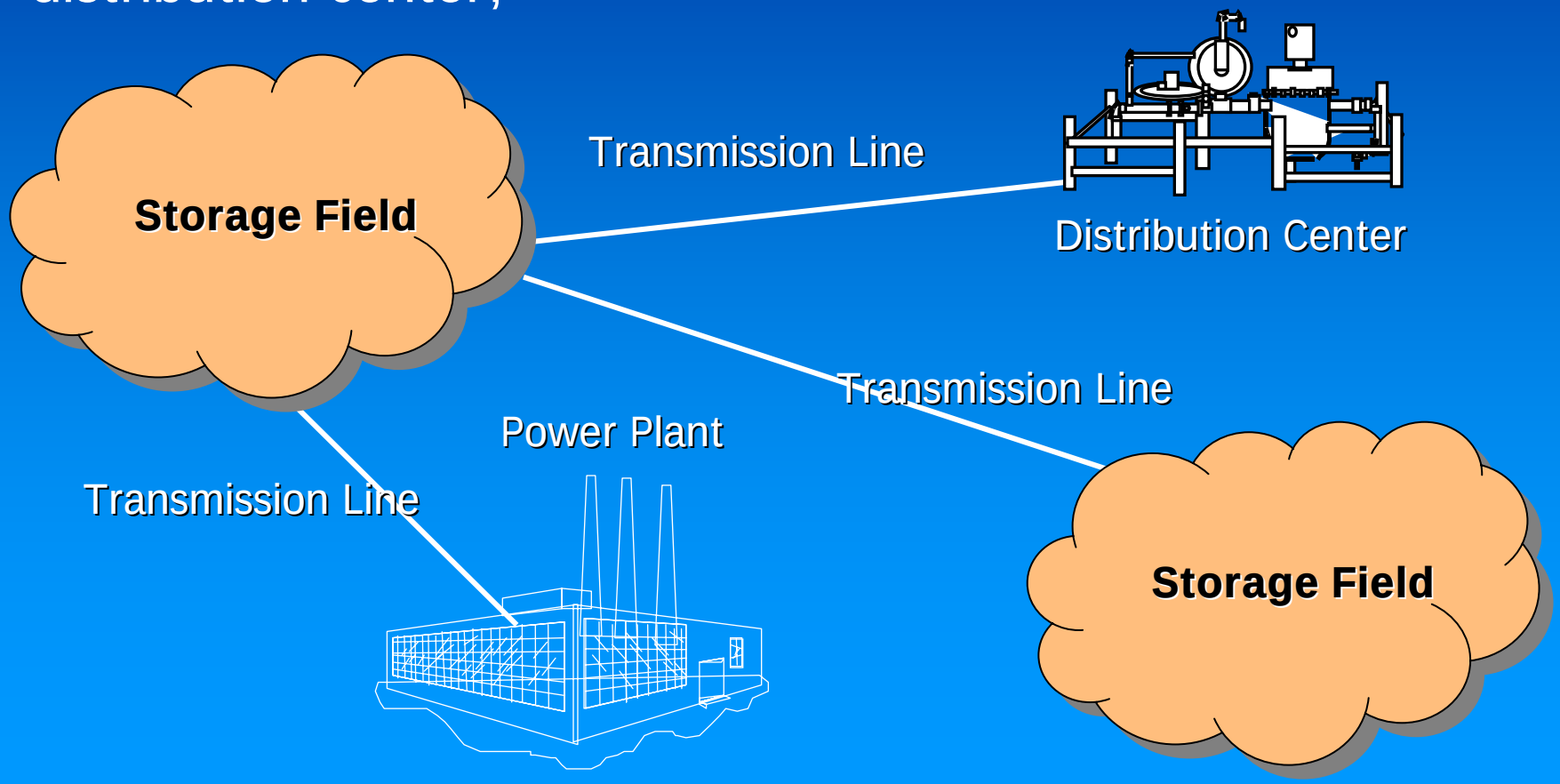

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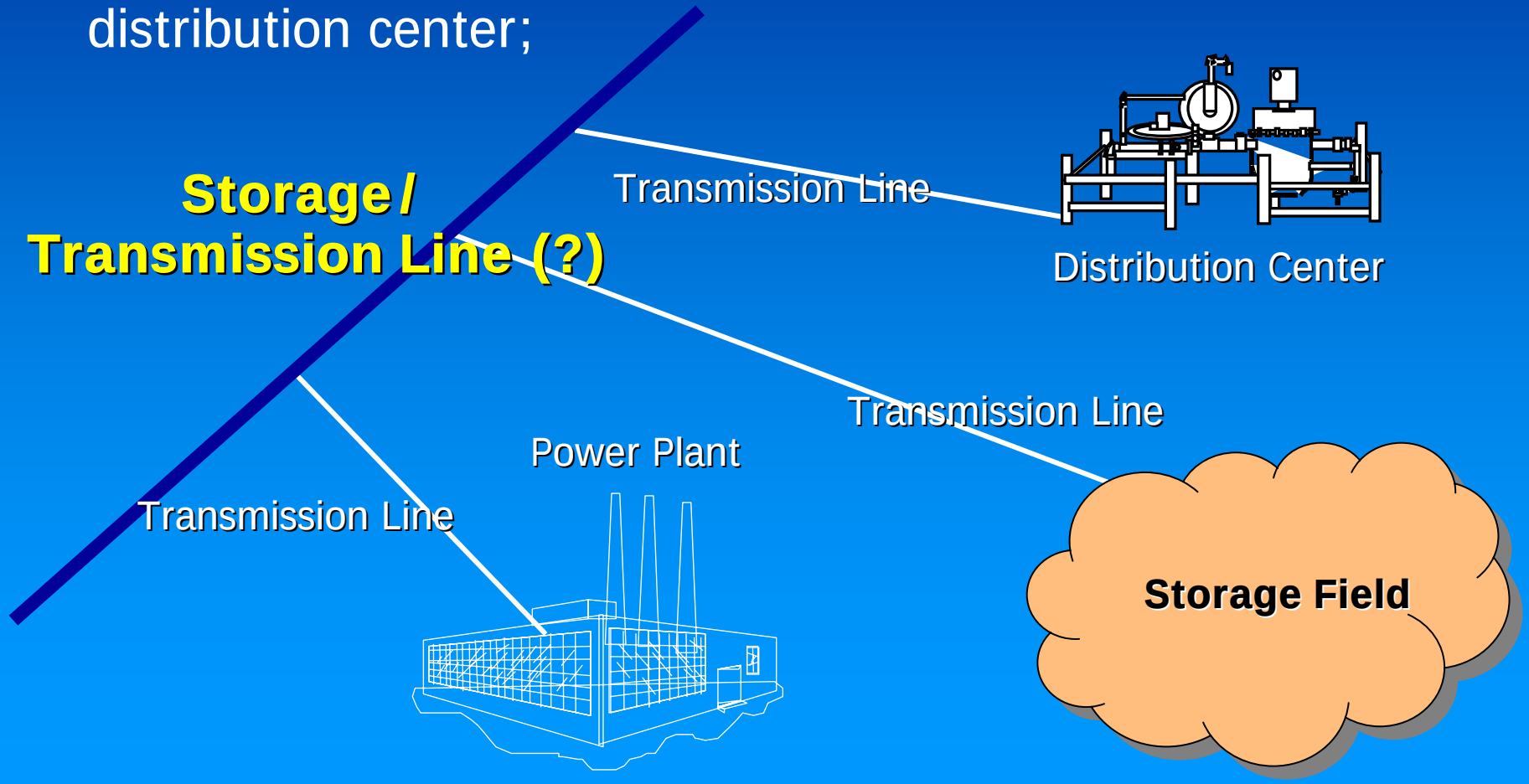
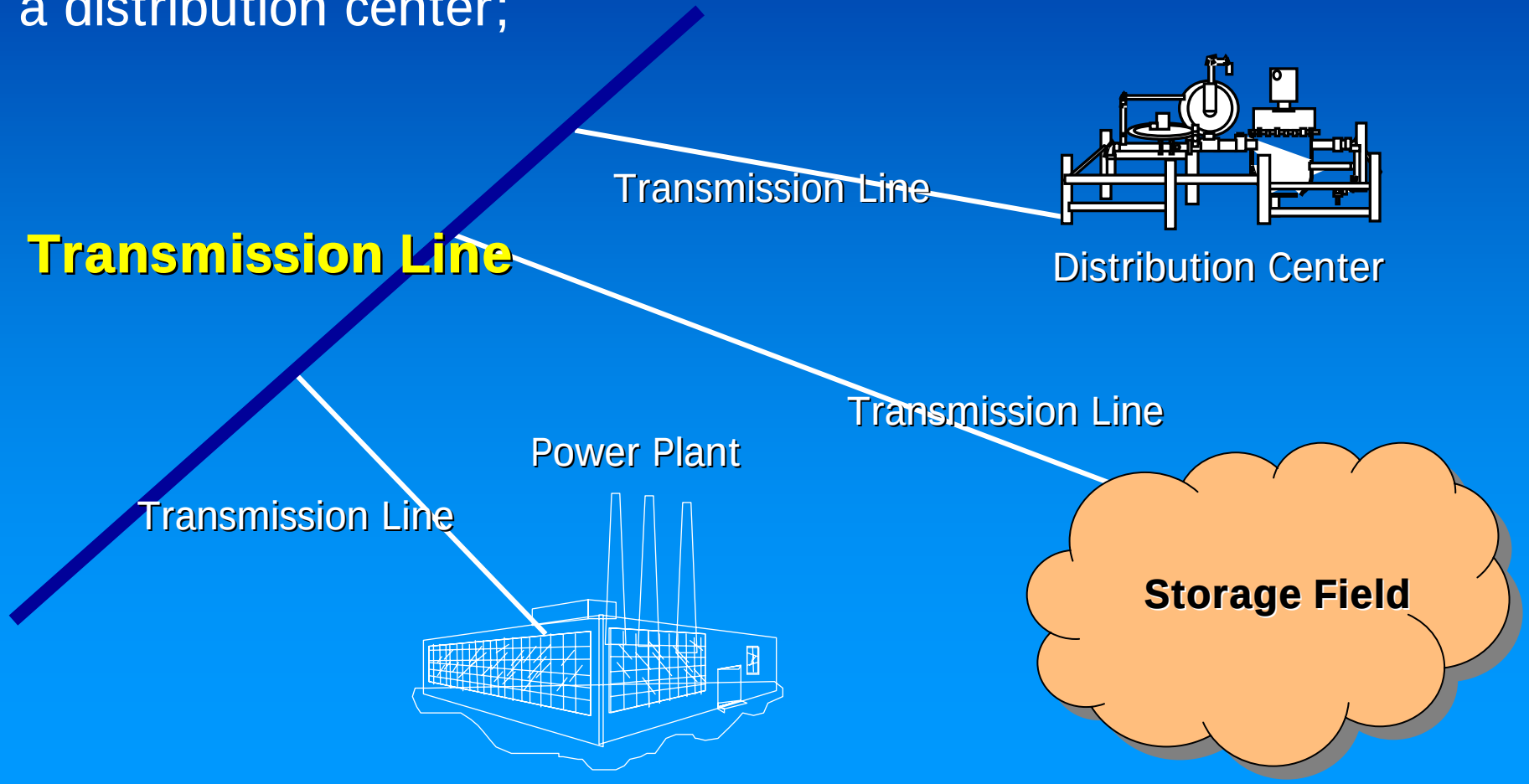
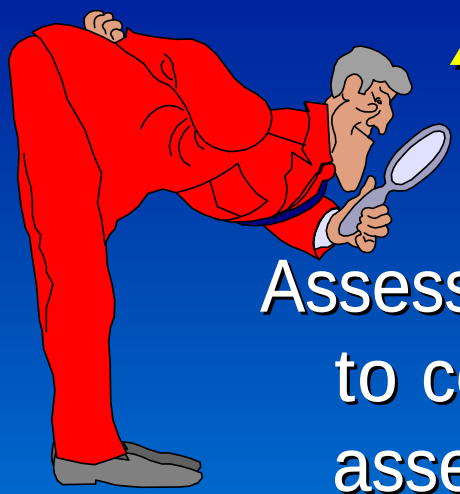


Transmission Line

(a) Transports gas from a gathering line, storage facility, or another transmission line, to a distribution center, storage facility, or large volume customer that is not downstream from a distribution center;



Assessment Methods



Assessments are inspection methods, or means to collect relevant data. Approved assessments for IM are:

- In-line Inspections (smart pigs)
- Hydrostatic Testing
- Direct Assessment
- Other Technologies approved by OPS

Questions for Gas Transmission Operators

* Hydrostatic Tests ~ Can you take the line out of service?
* In-line Inspections ~ Are the lines piggable?
* Direct Assessments ~ What alternatives are available?

What is "Direct Assessment"?

"An integrity assessment method utilizing a structured process through which the operator is able to integrate knowledge of the physical characteristics and operating history of a pipeline system or segment with the results of inspection, examination, and evaluation in order to determine the integrity."

Direct Assessment 5-Step Process

1. Pre-Assessment (info gathering)
2. Indirect Examination (data gathering)
3. Direct Examination (priority areas)
4. Remediation (repair or replacement)
5. Post –Assessment (effectiveness of process)

Confirmatory Direct Assessment

A streamlined integrity assessment method that utilizes process steps similar to direct assessment to evaluate for the presence of corrosion and third-party damage.

Direct Assessments Include:

- External Corrosion Direct Assessment (ECDA)
- Internal Corrosion Direct Assessment (ICDA)
- Stress Corrosion Cracking Direct Assessment (SCCDA)

ECDA Tools Include:

- Close Interval Surveys (CIS)
- Direct Current Voltage Gradient (DCVG)
- Alternating Current Voltage Gradient (ACVG)
- Current Attenuation
- Pearson Surveys
- Pipeline Current Mapping (PCM)

ECDA Regions

Portions within a pipeline segment that:

- Similar physical characteristics
- Similar operating/corrosion history
- Similar future corrosion conditions
- Suitable for same assessment methods
- Operator can redefine at any time

ICDA Regions

- Extends from location where water first enters pipeline
- Encompasses entire area where internal corrosion may occur
- Operator must apply results of mathematical flow model

IM Program Elements

- HCA Identification
- Baseline Assessment
- Threat/Risk ID
- DA Plan-if applicable
- Remediation
- Continual Evaluation
- Confirmatory DA
- Prev/Mitigative
- Performance Metrics
- Recordkeeping
- Mgt of Change
- Quality Control
- Communication Plan
- Submittals to Reg.
- Min. Env/Safety Risk
- Identify New HCAs

Gas Integrity Management Rule

- Conduct Information Analysis
  - 192.917 and B31.8S Section 4
  - Gather Information Over Entire Pipeline Segment
  - Identify and Acquire Lacking Data
  - Assure Quality of Data
  - Integrate Data

Gas Integrity Management Rule

- Identify Threats to HCA's
  - 192.917 and B31.8S Section 2
  - External Corrosion
  - Internal Corrosion
  - SCC, Seam Issues, Third Party Damage, Etc.

Gas Integrity Management Rule

- Conduct Risk Assessment
  - 192.917(c) and B31.8S Section 5
  - Prioritize HCAs For Baseline Assessment
  - Majority of High Risk Segments Must be In Top 50 Percent to be assessed by December 17, 2007
  - Supports Identification of Preventive and Mitigative Measures

Gas Integrity Management Rule

- Identify Preventive and Mitigative Measures
  - 192.935 and B31.8S Section 7
  - Measures Must be in Addition to Part 192 Requirements
  - Designed to Prevent Failures and Mitigate Failure Consequences
  - Process Examines the Need for Additional Measures and their Implementation

Gas Integrity Management Rule

- Develop Baseline Assessment Plan
  - 192.919
  - Selected Assessment Method(s) Must be Consistent with Identified Threats
  - Assessment Methods:
    - In-line Inspection
    - Pressure Test
    - Direct Assessment
    - Other Equivalent Method

Gas Integrity Management Rule

- Baseline Assessment Plan Must Contain:
  - Identified Threat and Supporting Information
  - Assessment Method and Support for Selection
    - May Need Combination of Assessment Methods
  - Assessment Schedule and Risk Factors Considered
  - Procedure Addressing Environmental and Safety Risk

Gas Integrity Management Rule

- Conduct Assessments Per BAP
  - 192.921 and B31.8S Section 6
  - High Risk 50% by Dec. 17, 2007
  - All Others by Dec. 17, 2012
  - Newly Identified HCAs; 10-years from date identified
  - Newly Installed Pipe in HCA; 10-years from date installed.
  - Feed Results Into Risk Analysis

Gas Integrity Management Rule

- Mitigate and Repair Integrity Concerns
  - 192.933 and B31.8S Section 7
  - Must Evaluate All Anomalous Conditions
  - Must Remediate Conditions Reducing Pipeline Integrity
  - Must Demonstrate No Threat to Integrity Till After Next Reassessment
  - Must Take Pressure Reduction If Can't Respond Within Specified Timeframes
    - Can't Exceed 365 days without technical justification that integrity is not jeopardized

Gas Integrity Management Rule

- Establish Reassessment Interval
  - 192.937, 192.939, and B31.8S Section 8
  - Based on Risk Analysis
    - Can’t Assume Maximum Interval
  - May use Confirmatory Assessment
    - Every 7-years if Risk Assessment Gives Interval Longer that 7-years
    - Full Assessment Must Be Completed at Determined Interval

Gas Integrity Management Rule

- Assess IM Program Effectiveness
  - Must Electronically Report Semi-Annually to OPS
    - Number of Miles of Pipeline Inspected vs. Program Requirements
    - Number of Immediate Repairs Completed as a Result of the IM Inspection Program
    - Number of Scheduled Repairs Completed as a Result of the IM Inspection Program
    - Number of leaks, failures, and incidents (classified by cause)

Gas Integrity Management Rule

- Assess IM Program Effectiveness
  - Data Must Be Complete Through June 30th and December 31st of the Report Year
  - Data Must Be Submitted Two Months (60-Days) After the Specified Reporting Period
    - June 30th Submit by August 31st
    - December 31st Submit by March 2nd

Gas Integrity Management Rule

- Assess IM Program Effectiveness
  - First Report due by August 31, 2004
  - Per Advisory Bulletin ADB-04-02

Act & Regulation Compliance Dates

	Legislation	Regulation
Submit Gas Maps to NPMS	06/17/2003	Silent
OPS - Issue Regulations	12/17/2003	Silent
Begin Baseline Assessments	06/17/2004	Silent
Identify HCAs	Silent	12/17/2004
Establish IM Program - Identify Threats Conduct Risk Assessment Establish BAP Establish Framework & Procedures	12/17/2004	12/17/2004

Act & Regulation Compliance Dates

	Legislation	Regulation
OPS - Complete Evaluation of Rule Impact on Safety/Environment	12/17/2006	Silent
Complete BA of 50% Highest Risk HCAs	12/17/2007	12/17/2007
Complete BA of Remaining 50% HCAs	12/17/2012	12/17/2012
Reassess HCAs Every 7 yrs.	✓	✓
Allows Waivers - Product Supply & ILI Tool Availability	✓	✓

Path Forward Gas IM

- Protocol Development
- Questions – FAQs
- Public Meetings
- Inspections
- Gas IM Resources

Protocol Development

- Protocol Development Team Composed of Federal and State Inspectors
- Protocols Tied Closely to Rule Requirements
- Feedback Via
  - Pilot Inspections – 3rd Quarter 2004
  - Web Site Posting of Protocols
  - Outreach Meeting – 4th Quarter 2004
  - OPS Looks Toward Continuing Improvement Based on Inspection Results

Protocol Development

- Questions to Evaluate Process and Methods
  - Example: Evaluate Process for Identifying HCAs?
- Questions to Review Implementation of the Process
  - Example: Review HCA Identification results to confirm implementation.

Protocol Development

- Questions to Evaluate Understanding of Integrity Issues and Actions Taken to Protect HCAs
  - Example: What integrity threats has the operator identified through its integrity assessments and what mitigation actions have been taken?
  - What additional preventive and mitigative measures have been taken to reduce risk?

Successful Gas IM Programs

- Documentation
  - Compliance Dates
  - Process Implementation Dates
  - Assessment Results
  - Mitigative Actions
  - Assumptions & Justifications
  - Process Revisions
  - Detailed Justification for Waivers

Successful Gas IM Programs

- Successful Processes
  - Identify Roles and Responsibilities
  - Identify Tasks to be Accomplished
  - Detail How Tasks are to be Accomplished
  - Establish When Tasks are to be Accomplished
  - Provide for Communication of Task Results
  - Records & Documentation

FAQ Development

- Questions Regarding IM Rule can be Posed to OPS via the Gas IM Web Site
  - Questions will be Posted Without Personal or Company Information for Feedback
  - Subject Matter Expert Team will Review Feedback and Draft Response
  - Response will be Posted on Web Site and Individual Email Sent to Requestor
  - OPS is Currently Gathering Gas IM Questions Via the Web Site

Public Meetings

- Public Meetings
  - Rule Overview – May 11-12, Houston, TX
    (Presentations on OPS website)
  - Inspection Protocols – 4th Quarter 2004

Gas IM Inspections

- Begin Gas IM Inspections
  - 2nd – 3rd Quarter 2005
- Will Adjust Inspection Model Based on Experience
- Teams will Consist of Federal and State Inspectors
  - Interstate Agents
  - State Programs Responsible for Intrastate Pipelines

Gas IM Resources

- Check Out The Web Site At:
  - http://primis.rspa.dot.gov/gasimp/
    - Meeting Links and Presentations
    - Pose Questions – FAQ's
    - Rule Flowchart
    - Pilot Inspection Applications
    - Inspection Protocols